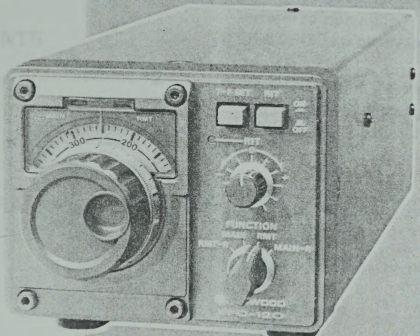
Kenwood VFO 120

KENWOOD N4CRU

REMOTE VFO

Model VFO-120



OPERATING MANUAL

FEATURES

Your new Model VFO-120 remote VFO has been carefully engineered and manufactured under rigid quality standards, and should give you satisfactory and dependable operation for many years.
Should any trouble arise with this unit, please contact your dealer, the nearest KENWOOD service facility, or the factory.

AFTER UNPACKING

Shipping container:
Save the boxes and packing in the event your unit needs to be transported for temporary operation at a remote location, maintenance, or service.

NOTE: All reference to the TS-120V fully includes the TS-120S model.

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1. FEATURES 2
2. SPECIFICATIONS 3
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4. CONTROLS 3
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6. SCHEMATIC DIAGRAM 6

1. The model VFO-120 is a remote VFO designed for use with the TS-120 SSB transceiver, permitting cross-channel transceive operation.
2. The VFO-120 matches the TS-120 in design and appearance. Its mounting angle is also adjustable.
3. The FET oscillator circuit assures high stability and distortion-free output.
4. The combination of precision anti-backlash gearing and a linear variable capacitor allows accurate frequency reading. Calibration is at 1-kHz intervals from 0 to 25 kHz.
   The indented main knob is convenient for rapid tuning.
5. The RIT circuit allows independent receive frequency adjustment without disturbing the main tuning.
6. Transmit frequency can be preset (spotted) by simply pressing the T-F switch without using the FUNCTION switch. The VFO is placed in transmit mode during reception.
7. LED's are used as VFO and RIT indicators for error-free operation.
8. The VFO-120 receives power from its companion TS-120.
9. The VFO-120 is installed by simply connecting the supplied VFO and ground cables. The VFO cable carries the output, power, and control lines.

ACCESSORIES

The following accessory items are included with the unit.

Operating manual	1 copy
VFO cable	1 piece
Ground cable	1 piece

SN 960361

SPECIFICATIONS

Oscillator frequency	5.50 ~ 6.00 MHz
Oscillator circuit	Clapp
Output voltage	0.2 V ±1 dB (across 470-ohm load)
Frequency stability	Within 100 Hz per 30 minutes after 3 minute warm-up (at room temperature).
Solid-state complement	FET: 2 Transistor: 2 Diode: 6
Power source	From TS-120
Dimensions	123 (4-7/8)W × 96 (3-13/16)H × 235 (9-1/4)D mm (inches)
Weight	2.5 kg (3.5 lbs)

* Specifications are subject to change for improvement without notice.

SETUP

CONNECTION TO THE TS-120 (Fig. 1)

Connect the VFO cable to the VFO OUT connector on the VFO-120, and to the EXT VFO connector of the TS-120. Connect the ground cable between the GND terminals on both units.

Note:

1. To protect both transceiver and VFO, turn OFF the TS-120 power switch before connecting or disconnecting the VFO cable.
2. Check that the TS-120 FIX switch is in the VFO (released) position.

CONTROLS

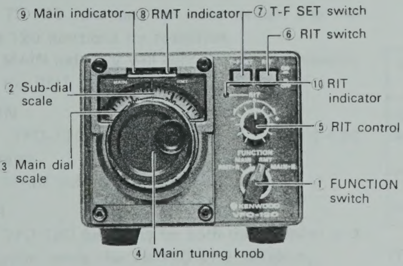


Fig. 2 Front Panel

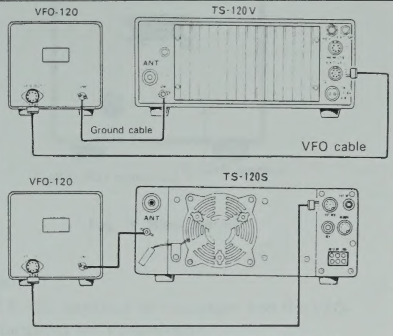


Fig. 1 Connection to the TS-120V/S

FRONT PANEL

1. FUNCTION switch

A four-position switch selects the VFO function:

RMT-R	Remote VFO controls reception.
MAIN	Remote VFO is inoperative.
RMT	Remote VFO controls both transmission and reception.
MAIN-R	Remote VFO controls transmission.

2. Sub-dial scale

The sub-dial is calibrated at 10-kHz intervals from 0 to 500. It operates with the main tuning knob.

3. Main dial scale

This dial is calibrated at 1-kHz intervals and allows direct frequency reading over a 0 to 25-kHz range. The skirt is coupled through a slip clutch for easy calibration.

4. Main tuning knob

This knob is calibrated from 0 to 25 kHz at 1-kHz intervals.

The indented knob is convenient for rapid tuning. The dial stops rotating at the 500-kHz point on the scale.

CAUTION: Do not force tuning past the stops; it will damage the dial mechanism.

5. RIT (Receiver Incremental Tuning) control

This control is used to vary the receive frequency by approximately ±1.5 kHz, independent of the transmit frequency. It is used when the receive and transmit frequency must be slightly offset.

REAR PANEL

1. VFO OUT connector
   Connect the VFO cable to this and the TS-120 EXT VFO connector.
2. GND terminal
   Connect the ground cable to this and the TS-120 GND terminal.

6. RIT switch

This switch turns the RIT function ON and OFF.

(OUT) : RIT OFF
(IN) : RIT ON

7. T-F SET switch

This switch is used to indicate (spot) the transmit frequency. (It will not function during transmission.)

8. RMT indicator

This indicator lights when the remote VFO is in operation.

9. MAIN indicator

This lights when the TS-120 VFO controls operation.

10. RIT indicator

This lights when the RIT control is active.

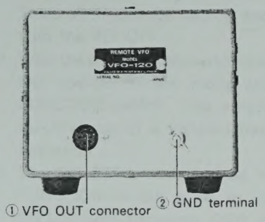


Fig. 3 Rear Panel

OPERATION

FUNCTION SWITCH OPERATION

RMT-R

The TS-120 functions for transmission, and the VFO-120 functions for reception.

The MAIN indicator will light during transmission, and the RMT indicator during reception.

MAIN

The VFO-120 stands by, while the TS-120 operates.

The MAIN indicator remains ON.

RMT

The VFO-120 functions for both transmission and reception, while the TS-120 VFO stands by.

The RMT indicator remains ON.

MAIN-R

The TS-120 functions for reception, and the VFO-120 functions for transmission.

The MAIN indicator will light during reception, and the RMT indicator during transmission.

Table 1 FUNCTION Switch Operation

FUNCTION Switch Position	TS-120 VFO	VFO-120
RMT-R	Transmission	Reception
MAIN	Transmission and reception	Stand by
RMT	Stand by	Transmission and reception
MAIN-R	Reception	Transmission

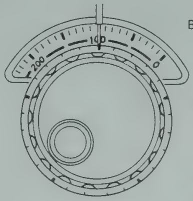
(The TS-120 FIX switch should be in the VFO Position)

RIT SWITCH OPERATION

Turn the RIT switch ON and the indicator will light. By adjusting the RIT control the VFO receive frequency can be varied ±1.5 kHz without affecting the transmit frequency.

At the zero (mid-point) position the receive frequency is the same as when the RIT circuit is turned off.

When a frequency is selected by the main tuning knob at RIT-OFF, it is possible to receive two frequencies by turning the RIT ON and OFF.



[Example]

BAND switch: 14 MHz

Dial setting: 100 kHz

Operating frequency:
14000 + 100
= 14100 kHz

Fig. 4 Reading the Operating Frequency

DIAL CALIBRATION (FIG. 5)

Calibration method is the same as for the TS-120 VFO. Set the FUNCTION switch to RMT-R or RMT, and the TS-120 CAL switch to ON. By turning the main tuning knob, a beat signal will be heard every 25 kHz.

Adjust the knob for zero beat. Hold the main tuning knob stationary, and slip the dial skirt so the 5 kHz (long line) markings on the dial or the frequency reading on the TS-120 digital display is correctly aligned with the dial cursor. (The TS-120 MODE switch can be in any position.)

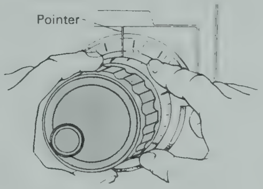


Fig. 5 Frequency Calibration

READING THE OPERATING FREQUENCY

The dial mechanism of the VFO-120 is the same as that of the TS-120. The main dial is calibrated at 1 kHz intervals from 0 to 25 kHz (full rotation). The sub-dial is calibrated at 10 kHz intervals.

In SSB mode, the frequency selected indicates a suppressed carrier frequency and, in CW mode, the frequency indicates an operating frequency 800 Hz higher than the receive frequency (Fig. 4).

T-F SET SWITCH OPERATION

1. Depress this push-button switch to select a transmit frequency for cross frequency operation. With the FUNCTION switch set to RMT-R or MAIN-R, depress the switch and the transmit VFO will energize, and the transmit frequency will be displayed. Set the transmit frequency by turning the main tuning knob. Transmit frequency setting should be made with the RIT OFF.
2. With the push-button switch released, the VFO will operate in the mode selected by the FUNCTION switch. This switch is useful for quick set-up of a transmit frequency for DX operation.
3. The T-F SET switch is used only when the FUNCTION switch is set to the MAIN-R or RMT-R (split frequency QSO where transmit and receive frequencies are independent. Operating condition can be checked by the LED's, thus preventing misoperation.

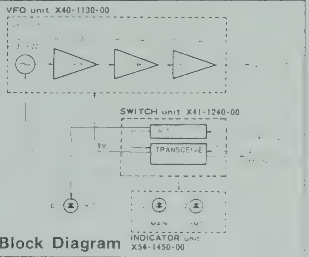
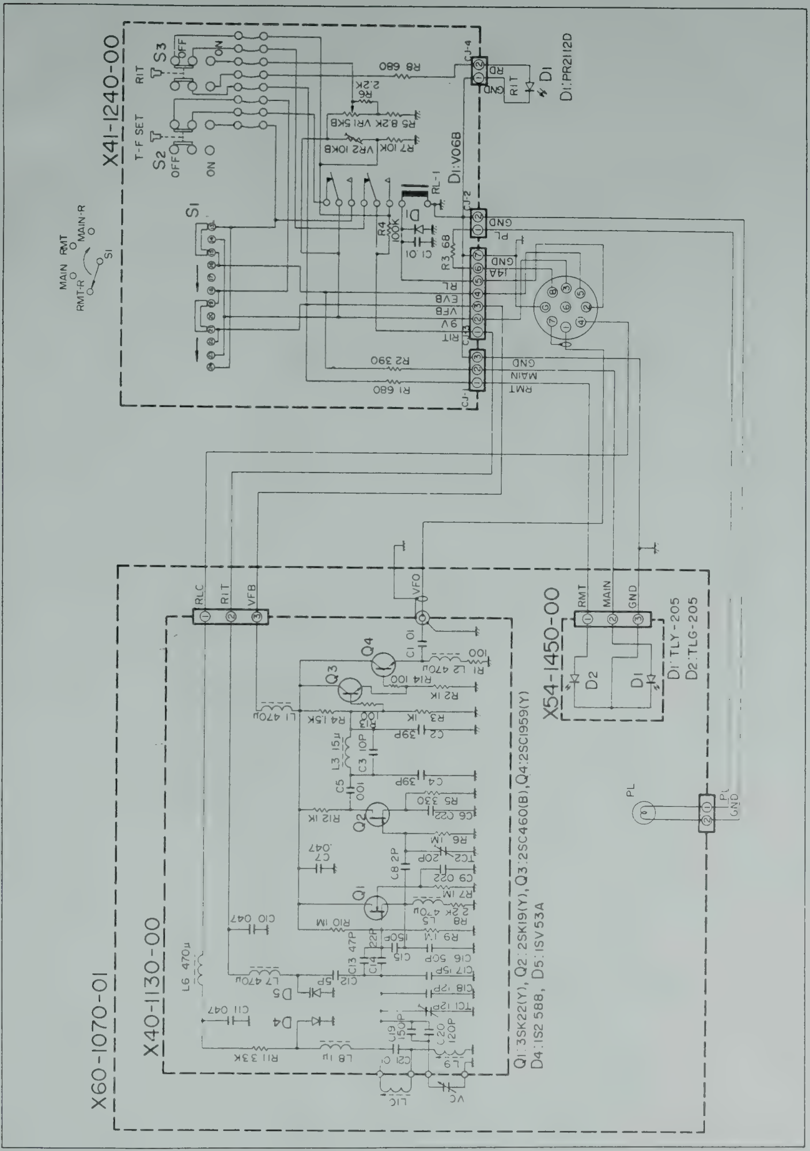


Fig. 6 Block Diagram

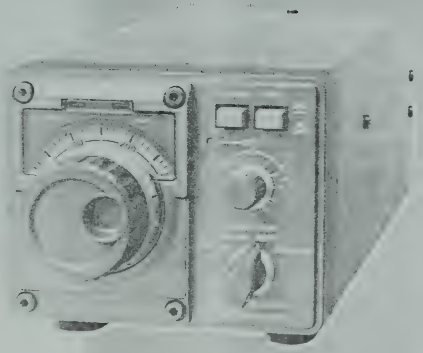
SCHEMATIC DIAGRAM

* Circuit design and ratings are subject to change for improvement without notice.



KENWOOD N4CRU

Model VFO-120



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FEATURES

1. The model VFO-120 is a remote VFO designed for use with the TS-120 SSB transceiver, permitting cross-channel transceive operation.
2. The VFO-120 matches the TS-120 in design and appearance. Its mounting angle is also adjustable.
3. The FET oscillator circuit assures high stability and distortion-free output.
4. The combination of precision anti-backlash gearing and a linear variable capacitor allows accurate frequency reading. Calibration is at 1-kHz intervals from 0 to 25 kHz.
   The indented main knob is convenient for rapid tuning.
5. The RIT circuit allows independent receive frequency adjustment without disturbing the main tuning.
6. Transmit frequency can be preset (spotted) by simply pressing the T-F switch without using the FUNCTION switch. The VFO is placed in transmit mode during reception.
7. LED's are used as VFO and RIT indicators for error-free operation.
8. The VFO-120 receives power from its companion TS-120.
9. The VFO-120 is installed by simply connecting the supplied VFO and ground cables. The VFO cable carries the output, power, and control lines.

ACCESSORIES

The following accessory items are included with the unit.

Operating manual	1 copy
VFO cable	1 piece
Ground cable	1 piece

SN 960361

SPECIFICATIONS

Oscillator frequency	5.50 ~ 6.00 MHz
Oscillator circuit	Clapp
Output voltage	0.2 V ±1 dB (across 470-ohm load)
Frequency stability	Within 100 Hz per 30 minutes after 3 minute warm-up (at room temperature).
Solid-state complement	FET: 2 Transistor: 2 Diode: 6
Power source	From TS-120
Dimensions	123 (4-7/8)W × 96 (3-13/16)H × 235 (9-1/4)D mm (inches)
Weight	2.5 kg (3.5 lbs)

* Specifications are subject to change for improvement without notice.

SETUP

CONNECTION TO THE TS-120 (Fig. 1)

Connect the VFO cable to the VFO OUT connector on the VFO-120, and to the EXT VFO connector of the TS-120. Connect the ground cable between the GND terminals on both units.

Note:

1. To protect both transceiver and VFO, turn OFF the TS-120 power switch before connecting or disconnecting the VFO cable.
2. Check that the TS-120 FIX switch is in the VFO (released) position.

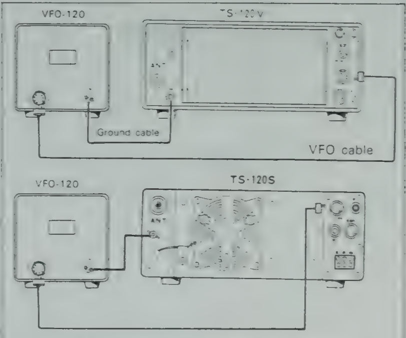


Fig. 1 Connection to the TS-120V S

CONTROLS

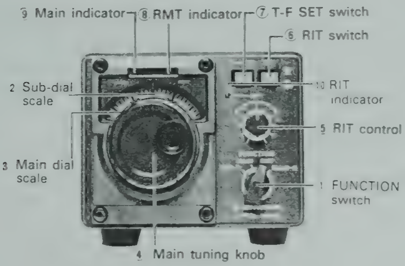


Fig. 2 Front Panel

FRONT PANEL

1. FUNCTION switch

A four-position switch selects the VFO function:

RMT-R	Remote VFO controls reception.
MAIN	Remote VFO is inoperative.
RMT	Remote VFO controls both transmission and reception
MAIN-R	Remote VFO controls transmission.

2. Sub-dial scale

The sub-dial is calibrated at 10-kHz intervals from 0 to 500. It operates with the main tuning knob

3. Main dial scale

This dial is calibrated at 1-kHz intervals and allows direct frequency reading over a 0 to 25-kHz range. The skirt is coupled through a slip clutch for easy calibration.

4. Main tuning knob

This knob is calibrated from 0 to 25 kHz at 1-kHz intervals.

The indented knob is convenient for rapid tuning. The dial stops rotating at the 500-kHz point on the scale.

CAUTION: Do not force tuning past the stops; it will damage the dial mechanism.

5. RIT (Receiver Incremental Tuning) control

This control is used to vary the receive frequency by approximately ±1.5 kHz, independent of the transmit frequency. It is used when the receive and transmit frequency must be slightly offset.

6. RIT switch

This switch turns the RIT function ON and OFF.

(OUT) : RIT OFF
(IN) : RIT ON

7. T-F SET switch

This switch is used to indicate (spot) the transmit frequency. (It will not function during transmission.)

8. RMT indicator

This indicator lights when the remote VFO is in operation.

9. MAIN indicator

This lights when the TS-120 VFO controls operation.

10. RIT indicator

This lights when the RIT control is active.

REAR PANEL

1. VFO OUT connector
   Connect the VFO cable to this and the TS-120 EXT VFO connector.
2. GND terminal
   Connect the ground cable to this and the TS-120 GND terminal.

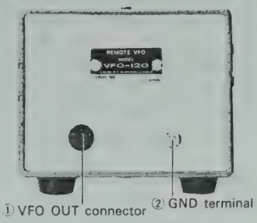


Fig. 3 Rear Panel

OPERATION

FUNCTION SWITCH OPERATION

RMT-R

The TS-120 functions for transmission, and the VFO-120 functions for reception.

The MAIN indicator will light during transmission, and the RMT indicator during reception.

MAIN

The VFO-120 stands by, while the TS-120 operates.

The MAIN indicator remains ON.

RMT

The VFO-120 functions for both transmission and reception, while the TS-120 VFO stands by.

The RMT indicator remains ON.

MAIN-R

The TS-120 functions for reception, and the VFO-120 functions for transmission.

The MAIN indicator will light during reception, and the RMT indicator during transmission.

Table 1 FUNCTION Switch Operation

FUNCTION Switch Position	TS-120 VFO	VFO-120
RMT-R	Transmission	Reception
MAIN	Transmission and reception	Stand by
RMT	Stand by	Transmission and reception
MAIN-R	Reception	Transmission

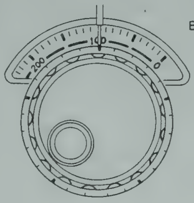
(The TS-120 FIX switch should be in the VFO Position)

RIT SWITCH OPERATION

Turn the RIT switch ON and the indicator will light. By adjusting the RIT control the VFO receive frequency can be varied ±1.5 kHz without affecting the transmit frequency.

At the zero (mid-point) position the receive frequency is the same as when the RIT circuit is turned off.

When a frequency is selected by the main tuning knob at RIT-OFF, it is possible to receive two frequencies by turning the RIT ON and OFF.



[Example]

BAND switch: 14 MHz

Dial setting: 100 kHz

Operating frequency:
14000 + 100
= 14100 kHz

Fig. 4 Reading the Operating Frequency

DIAL CALIBRATION (FIG. 5)

Calibration method is the same as for the TS-120 VFO. Set the FUNCTION switch to RMT-R or RMT, and the TS-120 CAL switch to ON. By turning the main tuning knob, a beat signal will be heard every 25 kHz.

Adjust the knob for zero beat. Hold the main tuning knob stationary, and slip the dial skirt so the 5 kHz (long line) markings on the dial or the frequency reading on the TS-120 digital display is correctly aligned with the dial cursor. (The TS-120 MODE switch can be in any position.)

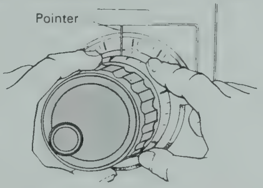


Fig. 5 Frequency Calibration

READING THE OPERATING FREQUENCY

The dial mechanism of the VFO-120 is the same as that of the TS-120. The main dial is calibrated at 1 kHz intervals from 0 to 25 kHz (full rotation). The sub-dial is calibrated at 10 kHz intervals.

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T-F SET SWITCH OPERATION

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2. With the push-button switch released, the VFO will operate in the mode selected by the FUNCTION switch. This switch is useful for quick set-up of a transmit frequency for DX operation.
3. The T-F SET switch is used only when the FUNCTION switch is set to the MAIN-R or RMT-R (split frequency QSO where transmit and receive frequencies are independent. Operating condition can be checked by the LED's, thus preventing misoperation.

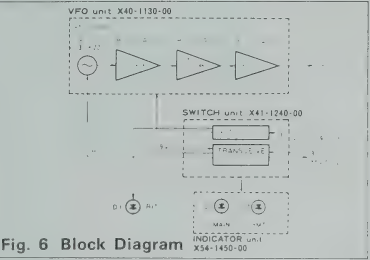

Fig. 6 Block Diagram

SCHEMATIC DIAGRAM

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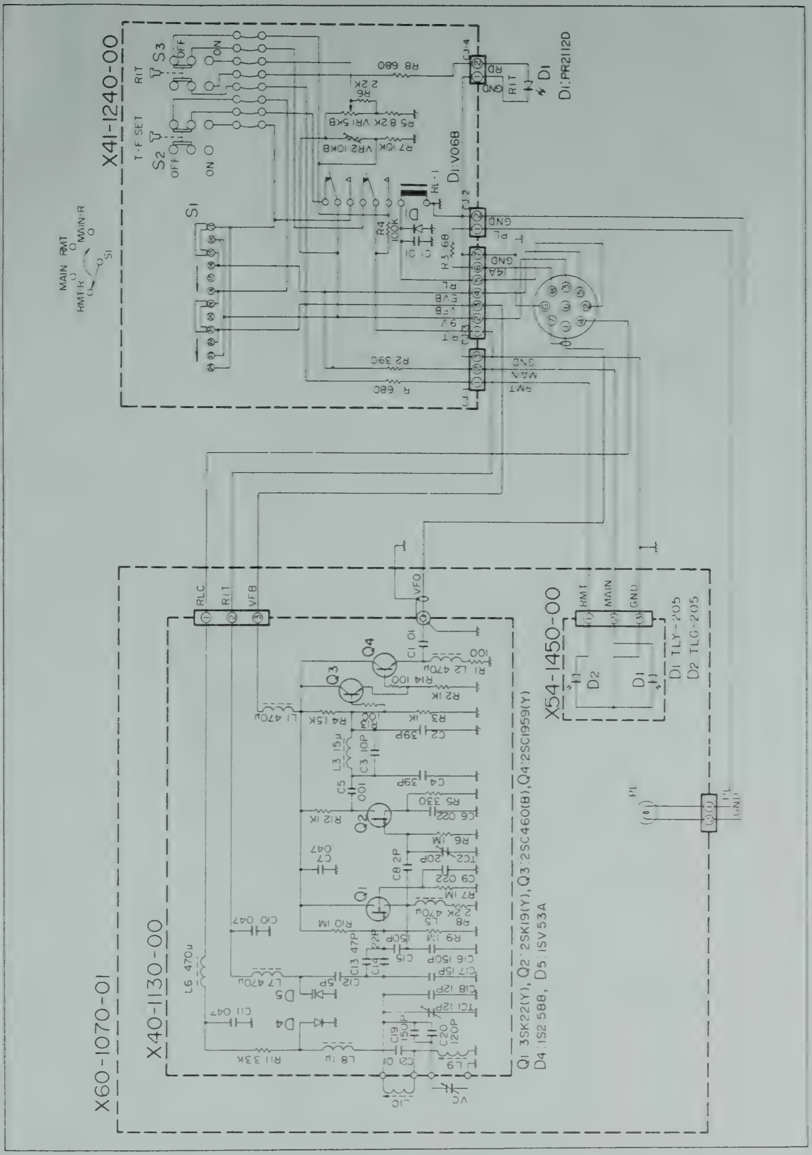

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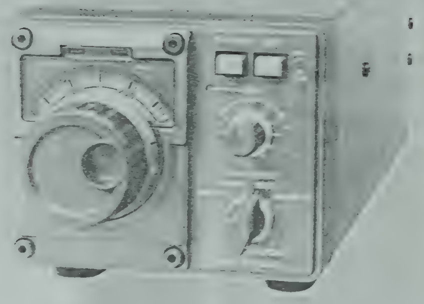
Model VFO-120



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2. The VFO-120 matches the TS-120 in design and appearance. Its mounting angle is also adjustable.
3. The FET oscillator circuit assures high stability and distortion-free output.
4. The combination of precision anti-backlash gearing and a linear variable capacitor allows accurate frequency reading. Calibration is at 1-kHz intervals from 0 to 25 kHz.
   The indented main knob is convenient for rapid tuning.
5. The RIT circuit allows independent receive frequency adjustment without disturbing the main tuning.
6. Transmit frequency can be preset (spotted) by simply pressing the T-F switch without using the FUNCTION switch. The VFO is placed in transmit mode during reception.
7. LED's are used as VFO and RIT indicators for error-free operation.
8. The VFO-120 receives power from its companion TS-120.
9. The VFO-120 is installed by simply connecting the supplied VFO and ground cables. The VFO cable carries the output, power, and control lines.

ACCESSORIES

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Weight	2.5 kg (3.5 lbs)

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SETUP

CONNECTION TO THE TS-120 (Fig. 1)

Connect the VFO cable to the VFO OUT connector on the VFO-120, and to the EXT VFO connector of the TS-120. Connect the ground cable between the GND terminals on both units.

Note:

1. To protect both transceiver and VFO, turn OFF the TS-120 power switch before connecting or disconnecting the VFO cable.
2. Check that the TS-120 FIX switch is in the VFO (released) position.

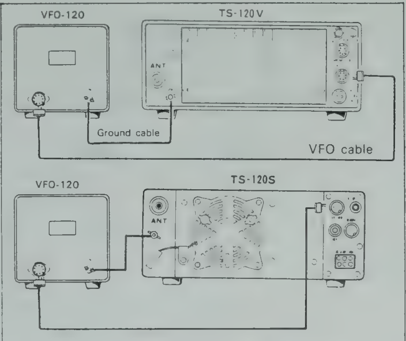

Fig. 1 Connection to the TS-120V/S

CONTROLS

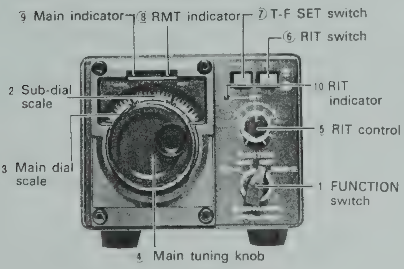

Fig. 2 Front Panel

FRONT PANEL

1. FUNCTION switch

A four-position switch selects the VFO function:

RMT-R	Remote VFO controls reception.
MAIN	Remote VFO is inoperative.
RMT	Remote VFO controls both transmission and reception.
MAIN-R	Remote VFO controls transmission.

2. Sub-dial scale

The sub-dial is calibrated at 10-kHz intervals from 0 to 500. It operates with the main tuning knob.

3. Main dial scale

This dial is calibrated at 1-kHz intervals and allows direct frequency reading over a 0 to 25-kHz range. The skirt is coupled through a slip clutch for easy calibration.

4. Main tuning knob

This knob is calibrated from 0 to 25 kHz at 1-kHz intervals.

The indented knob is convenient for rapid tuning. The dial stops rotating at the 500-kHz point on the scale.

CAUTION: Do not force tuning past the stops; it will damage the dial mechanism.

5. RIT (Receiver Incremental Tuning) control

This control is used to vary the receive frequency by approximately ±1.5 kHz, independent of the transmit frequency. It is used when the receive and transmit frequency must be slightly offset.

6. RIT switch

This switch turns the RIT function ON and OFF.

(OUT) : RIT OFF
(IN) : RIT ON

7. T-F SET switch

This switch is used to indicate (spot) the transmit frequency. (It will not function during transmission.)

8. RMT indicator

This indicator lights when the remote VFO is in operation.

9. MAIN indicator

This lights when the TS-120 VFO controls operation.

10. RIT indicator

This lights when the RIT control is active.

REAR PANEL

1. VFO OUT connector
   Connect the VFO cable to this and the TS-120 EXT VFO connector.
2. GND terminal
   Connect the ground cable to this and the TS-120 GND terminal.

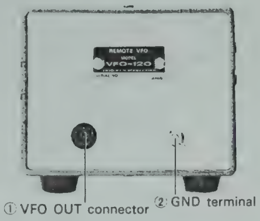

Fig. 3 Rear Panel

OPERATION

FUNCTION SWITCH OPERATION

RMT-R

The TS-120 functions for transmission, and the VFO-120 functions for reception.

The MAIN indicator will light during transmission, and the RMT indicator during reception.

MAIN

The VFO-120 stands by, while the TS-120 operates.

The MAIN indicator remains ON.

RMT

The VFO-120 functions for both transmission and reception, while the TS-120 VFO stands by.

The RMT indicator remains ON.

MAIN-R

The TS-120 functions for reception, and the VFO-120 functions for transmission.

The MAIN indicator will light during reception, and the RMT indicator during transmission.

Table 1 FUNCTION Switch Operation

FUNCTION Switch Position	TS-120 VFO	VFO-120
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RMT	Stand by	Transmission and reception
MAIN-R	Reception	Transmission

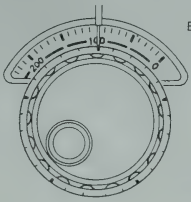
(The TS-120 FIX switch should be in the VFO Position)

RIT SWITCH OPERATION

Turn the RIT switch ON and the indicator will light. By adjusting the RIT control the VFO receive frequency can be varied ±1.5 kHz without affecting the transmit frequency.

At the zero (mid-point) position the receive frequency is the same as when the RIT circuit is turned off.

When a frequency is selected by the main tuning knob at RIT-OFF, it is possible to receive two frequencies by turning the RIT ON and OFF.



[Example]

BAND switch: 14 MHz

Dial setting: 100 kHz

Operating frequency:
14000 + 100
= 14100 kHz

Fig. 4 Reading the Operating Frequency

DIAL CALIBRATION (FIG. 5)

Calibration method is the same as for the TS-120 VFO. Set the FUNCTION switch to RMT-R or RMT, and the TS-120 CAL switch to ON. By turning the main tuning knob, a beat signal will be heard every 25 kHz.

Adjust the knob for zero beat. Hold the main tuning knob stationary, and slip the dial skirt so the 5 kHz (long line) markings on the dial or the frequency reading on the TS-120 digital display is correctly aligned with the dial cursor. (The TS-120 MODE switch can be in any position.)

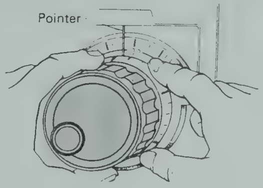


Fig. 5 Frequency Calibration

READING THE OPERATING FREQUENCY

The dial mechanism of the VFO-120 is the same as that of the TS-120. The main dial is calibrated at 1 kHz intervals from 0 to 25 kHz (full rotation). The sub-dial is calibrated at 10 kHz intervals.

In SSB mode, the frequency selected indicates a suppressed carrier frequency and, in CW mode, the frequency indicates an operating frequency 800 Hz higher than the receive frequency (Fig. 4).

T-F SET SWITCH OPERATION

1. Depress this push-button switch to select a transmit frequency for cross frequency operation. With the FUNCTION switch set to RMT-R or MAIN-R, depress the switch and the transmit VFO will energize, and the transmit frequency will be displayed. Set the transmit frequency by turning the main tuning knob. Transmit frequency setting should be made with the RIT OFF.
2. With the push-button switch released, the VFO will operate in the mode selected by the FUNCTION switch. This switch is useful for quick set-up of a transmit frequency for DX operation.
3. The T-F SET switch is used only when the FUNCTION switch is set to the MAIN-R or RMT-R (split frequency QSO where transmit and receive frequencies are independent. Operating condition can be checked by the LED's, thus preventing misoperation.

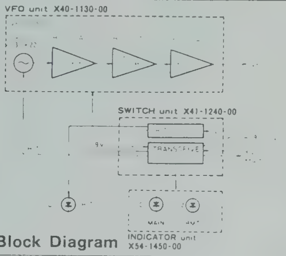
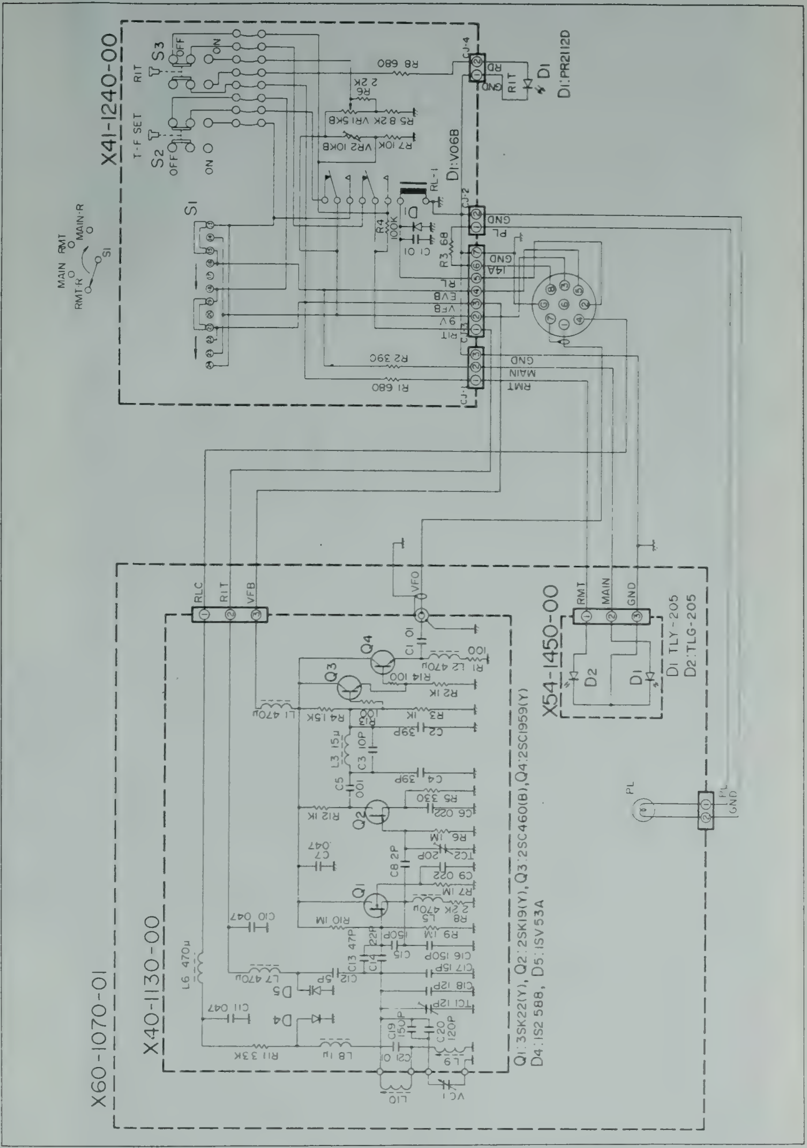


Fig. 6 Block Diagram

SCHEMATIC DIAGRAM

* Circuit design and ratings are subject to change for improvement without notice.



Q1:3SK22(Y), Q2:2SK19(Y), Q3:2SC460(B), Q4:2SC1959(Y)
D4:1S2 588, D5:1SV53A

KENWOOD N4CRU

REMOTE VFO

Model VFO-120

OPERATING MANUAL

Your new Model VFO-120 remote VFO has been carefully engineered and manufactured under rigid quality standards, and should give you satisfactory and dependable operation for many years. Should any trouble arise with this unit, please contact your dealer, the nearest KENWOOD service facility, or the factory.

AFTER UNPACKING

Shipping container:
Save the boxes and packing in the event your unit needs to be transported for temporary operation at a remote location, maintenance, or service.

NOTE: All reference to the TS-120V fully includes the TS-120S model.

CONTENTS

1. FEATURES 2
2. SPECIFICATIONS 3
3. SETUP 3
4. CONTROLS 3
5. OPERATION 4
6. SCHEMATIC DIAGRAM 6

FEATURES

1. The model VFO-120 is a remote VFO designed for use with the TS-120 SSB transceiver, permitting cross-channel transceive operation.
2. The VFO-120 matches the TS-120 in design and appearance. Its mounting angle is also adjustable.
3. The FET oscillator circuit assures high stability and distortion-free output.
4. The combination of precision anti-backlash gearing and a linear variable capacitor allows accurate frequency reading. Calibration is at 1-kHz intervals from 0 to 25 kHz.
   The indented main knob is convenient for rapid tuning.
5. The RIT circuit allows independent receive frequency adjustment without disturbing the main tuning.
6. Transmit frequency can be preset (spotted) by simply pressing the T-F switch without using the FUNCTION switch. The VFO is placed in transmit mode during reception.
7. LED's are used as VFO and RIT indicators for error-free operation.
8. The VFO-120 receives power from its companion TS-120.
9. The VFO-120 is installed by simply connecting the supplied VFO and ground cables. The VFO cable carries the output, power, and control lines.

ACCESSORIES

The following accessory items are included with the unit.

Operating manual	1 copy
VFO cable	1 piece
Ground cable	1 piece

[redacted]

SPECIFICATIONS

Oscillator frequency	5.50 ~ 6.00 MHz
Oscillator circuit	Clapp
Output voltage	0.2 V ±1 dB (across 470-ohm load)
Frequency stability	Within 100 Hz per 30 minutes after 3 minute warm-up (at room temperature).
Solid-state complement	FET: 2 Transistor: 2 Diode: 6
Power source	From TS-120
Dimensions	123 (4-7/8)W × 96 (3-13/16)H × 235 (9-1/4)D mm (inches)
Weight	2.5 kg (3.5 lbs)

* Specifications are subject to change for improvement without notice.

SETUP

CONNECTION TO THE TS-120 (Fig. 1)

Connect the VFO cable to the VFO OUT connector on the VFO-120, and to the EXT VFO connector of the TS-120. Connect the ground cable between the GND terminals on both units.

Note:

1. To protect both transceiver and VFO, turn OFF the TS-120 power switch before connecting or disconnecting the VFO cable.
2. Check that the TS-120 FIX switch is in the VFO (released) position.

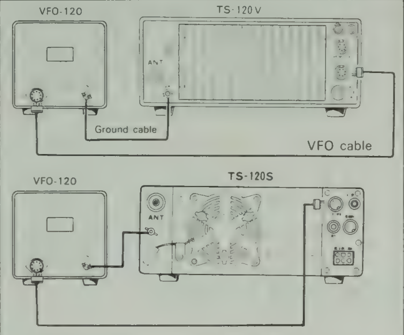


Fig. 1 Connection to the TS-120V/S

CONTROLS

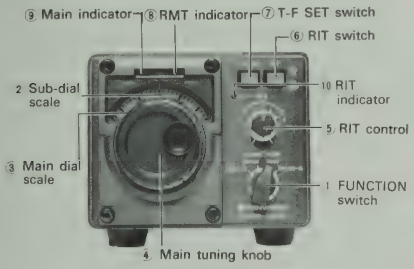


Fig. 2 Front Panel

FRONT PANEL

1. FUNCTION switch

A four-position switch selects the VFO function:

RMT-R	Remote VFO controls reception.
MAIN	Remote VFO is inoperative.
RMT	Remote VFO controls both transmission and reception.
MAIN-R	Remote VFO controls transmission.

2. Sub-dial scale

The sub-dial is calibrated at 10-kHz intervals from 0 to 500. It operates with the main tuning knob.

3. Main dial scale

This dial is calibrated at 1-kHz intervals and allows direct frequency reading over a 0 to 25-kHz range. The skirt is coupled through a slip clutch for easy calibration.

4. Main tuning knob

This knob is calibrated from 0 to 25 kHz at 1-kHz intervals.

The indented knob is convenient for rapid tuning. The dial stops rotating at the 500-kHz point on the scale.

CAUTION: Do not force tuning past the stops; it will damage the dial mechanism.

5. RIT (Receiver Incremental Tuning) control

This control is used to vary the receive frequency by approximately ±1.5 kHz, independent of the transmit frequency. It is used when the receive and transmit frequency must be slightly offset.

6. RIT switch

This switch turns the RIT function ON and OFF.

(OUT) : RIT OFF
(IN) : RIT ON

7. T-F SET switch

This switch is used to indicate (spot) the transmit frequency. (It will not function during transmission.)

8. RMT indicator

This indicator lights when the remote VFO is in operation.

9. MAIN indicator

This lights when the TS-120 VFO controls operation.

10. RIT indicator

This lights when the RIT control is active.

REAR PANEL

1. VFO OUT connector
   Connect the VFO cable to this and the TS-120 EXT VFO connector.
2. GND terminal
   Connect the ground cable to this and the TS-120 GND terminal.

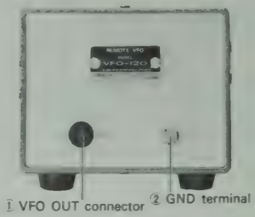


Fig. 3 Rear Panel

OPERATION

FUNCTION SWITCH OPERATION

RMT-R

The TS-120 functions for transmission, and the VFO-120 functions for reception.

The MAIN indicator will light during transmission, and the RMT indicator during reception.

MAIN

The VFO-120 stands by, while the TS-120 operates.

The MAIN indicator remains ON.

RMT

The VFO-120 functions for both transmission and reception, while the TS-120 VFO stands by.

The RMT indicator remains ON.

MAIN-R

The TS-120 functions for reception, and the VFO-120 functions for transmission.

The MAIN indicator will light during reception, and the RMT indicator during transmission.

Table 1 FUNCTION Switch Operation

FUNCTION Switch Position	TS-120 VFO	VFO-120
RMT-R	Transmission	Reception
MAIN	Transmission and reception	Stand by
RMT	Stand by	Transmission and reception
MAIN-R	Reception	Transmission

(The TS-120 FIX switch should be in the VFO Position)

RIT SWITCH OPERATION

Turn the RIT switch ON and the indicator will light. By adjusting the RIT control the VFO receive frequency can be varied ±1.5 kHz without affecting the transmit frequency.

At the zero (mid-point) position the receive frequency is the same as when the RIT circuit is turned off.

When a frequency is selected by the main tuning knob at RIT-OFF, it is possible to receive two frequencies by turning the RIT ON and OFF.

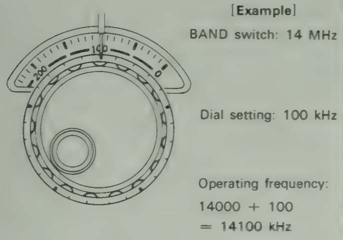
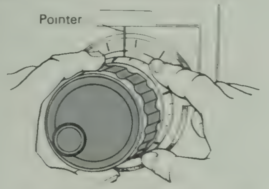


Fig. 4 Reading the Operating Frequency

DIAL CALIBRATION (FIG. 5)

Calibration method is the same as for the TS-120 VFO. Set the FUNCTION switch to RMT-R or RMT, and the TS-120 CAL switch to ON. By turning the main tuning knob, a beat signal will be heard every 25 kHz.

Adjust the knob for zero beat. Hold the main tuning knob stationary, and slip the dial skirt so the 5 kHz (long line) markings on the dial or the frequency reading on the TS-120 digital display is correctly aligned with the dial cursor. (The TS-120 MODE switch can be in any position.)



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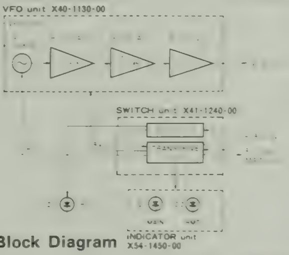

Fig. 6 Block Diagram

SCHEMATIC DIAGRAM

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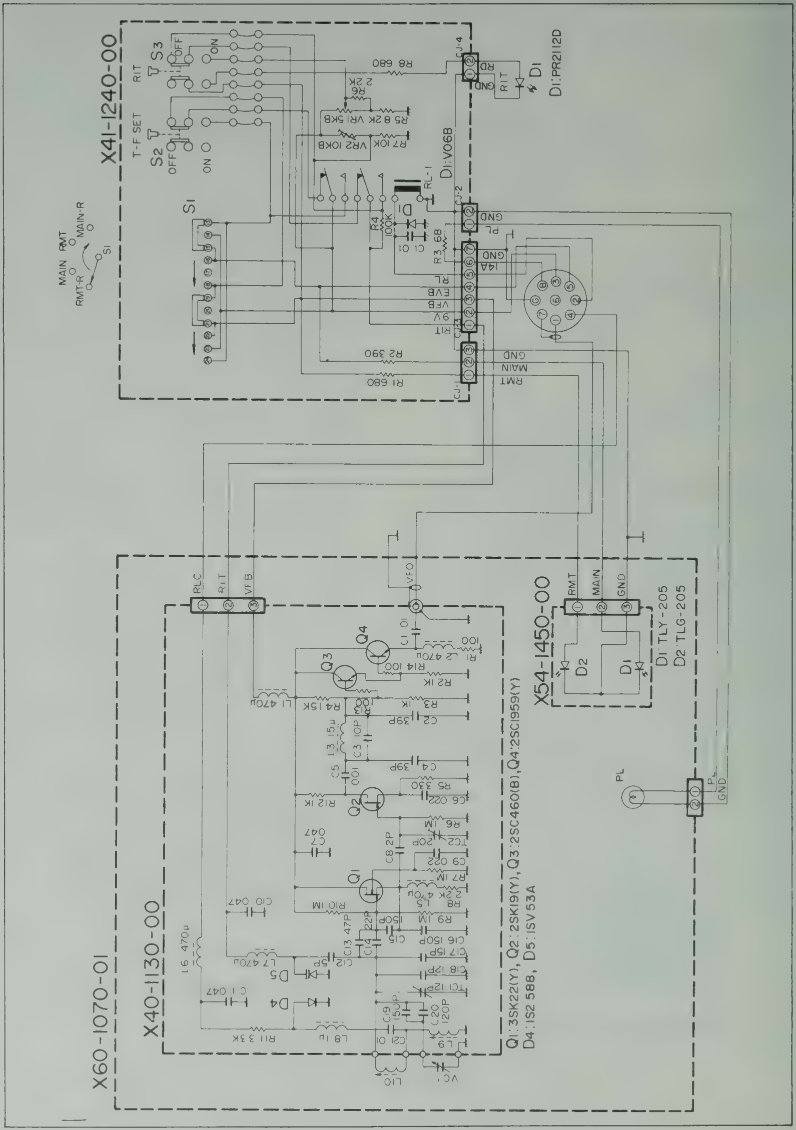

NOTES

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